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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/564,885

01/17/2006

Mitsuo Usami

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EXAMINER

ARORA, AJAY

ART UNIT

PAPER NUMBER

2892

MAIL DATE

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/564,885	Applicant(s) USAMI, MITSUO	
	Examiner AJAY K. ARORA	Art Unit 2892	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 13 June 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-9 is/are pending in the application.
- 4a) Of the above claim(s) 8 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☐ Claim(s) 1-7 and 9 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 17 January 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>1/17/06 & 5/1/07</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Election/Restrictions

1. Applicant's election without traverse of Group I, claims 1-7 and 9 in the reply filed on 06/13/2008 is acknowledged.

Specification

2. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 1-7 and 9 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

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Claim 1 recites “a width and a thickness of said antenna are set to 2.6 μm or larger and 10 μm or smaller”. It is not clear what this means because the language does not clarify which value applies to width and which value applies to thickness. It is also possible to interpret the above as both values applying to width and thickness, which effectively creates a range of 2.6 μm to 10 μm for both width and thickness. For the purpose of this office action, it will be assumed that the limitation reads on any of the above possibilities.

Claim 3 recites the limitation “said resin layer”. Claim 2 recites the limitation “said resin layer”. There is insufficient antecedent basis for this limitation in the claim. The term resin layer does not exist in the independent claims from which claim 3 depends. For the purpose of this examination, it will be assumed that the recitation is equivalent of “a resin layer”.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 1-2, 4-7 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Usami (US 2001/0012645), hereinafter Usami, in view of Aizawa (US US 2001/0038280), hereinafter Aizawa.

Regarding claim 1, Usami (refer to Figure 14) teaches a semiconductor device (page 1, para 0001) characterized by comprising:

- a semiconductor substrate (substrate of 12; also see 12 of Figure 7D) ;
- an antenna (74) made of a conductive material;
- an insulating layer (oxide film 115); and
- an integrated circuit formed on a surface of said semiconductor substrate (substrate of 12) that is capable of processing information to be transmitted/received from said antenna (page 1, para 0001 and page 3, para 0039),

wherein said antenna (74), insulating layer (115) and integrated circuit (on 12) are laminated in this order on the surface of said silicon substrate (substrate of 12), a thickness of said semiconductor substrate may be set to 200 μm or thinner (page 1, para 0011).

Usami does not teach that the conductive material is gold, that the semiconductor substrate is a "silicon substrate" and that "a width and a thickness of said antenna are set to 2.6 μm or larger and 10 μm or smaller". However, Usami discloses that shape and size of antenna may vary depending on frequency to be used (see page 2, para 0039, 7th and 8th sentences) and that silicon is a known semiconductor substrate material (page 4, para 0047). Further, Aizawa teaches that a conductive material on a semiconductor chip may be gold and that when such a conductor carries high frequency

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signals (like an antenna), the thickness of the conductive material is a known variable (see page 10, para 0205). It would have been obvious to one of ordinary skills in the art at the time of the invention to modify the invention of Usami so that the conductive material is gold, that the semiconductor substrate is a silicon substrate and that a width and a thickness of said antenna are set to $2.6\text{ }\mu\text{m}$ or larger and $10\text{ }\mu\text{m}$ or smaller. The ordinary artisan would have been motivated to modify Usami for at least the purpose of utilizing a conductive material that has high resistance to oxidation and that is compatible with common semiconductor substrate materials like silicon that are relatively inexpensive, while achieving a specific skin depth (determined by a combination of various parameters including conductive material and antenna dimensions) that enables the use of a low profile antenna that achieves required antenna design parameters (see Aizawa, page 10, para 0205).

Regarding claim 2, Usami (refer to Figure 14) teaches a semiconductor device (page 1, para 0001) characterized by comprising:

- an antenna (74) made of a conductive material;
- an insulating layer (oxide film 115); and
- an integrated circuit formed on a surface of a semiconductor substrate (substrate of 12; also see 12 of Figure 7D) for processing information to be transmitted/received from said antenna (page 1, para 0001 and page 3, para 0039),

wherein said antenna (74), insulating layer (115) and integrated circuit (on 12) are laminated in this order, a thickness of said semiconductor substrate is a thickness of said integrated circuit.

Usami does not teach that the conductive material is “gold” and that the semiconductor substrate is a “silicon substrate”. However, Usami discloses that silicon is a known semiconductor substrate material (page 4, para 0047). Further, Aizawa teaches that a conductive material on a semiconductor chip may be gold (see page 10, para 0205). It would have been obvious to one of ordinary skills in the art at the time of the invention to modify the invention of Usami so that the conductive material is gold and that the semiconductor substrate is a silicon substrate. The ordinary artisan would have been motivated to modify Usami for at least the purpose of utilizing a conductive material that has high resistance to oxidation and that is compatible with common semiconductor substrate materials like silicon that are relatively inexpensive (compared to, for example, GaAs substrates).

Regarding claim 4, Usami teaches substantially the claimed structure but does not teach that said antenna has a thickness and a width “not presenting a skin depth effect by electronic magnetic waves used by communications, and the width is narrower than 10 μm ”. However, Usami discloses that shape and size of antenna may vary depending on frequency to be used (see page 2, para 0039, 7th and 8th sentences). Further, Aizawa teaches that for a conductor capable of functioning as an antenna, it is desirable to not present a skin depth effect by electronic magnetic waves used by

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communications (see page 10, para 0205). It would have been obvious to one of ordinary skills in the art at the time of the invention to modify the invention of Usami so that said antenna has a thickness and a width not presenting a skin depth effect by electronic magnetic waves used by communications, and the width is narrower than 10 μm . The ordinary artisan would have been motivated to modify Usami for at least the purpose of preventing skin depth effect by adjusting among other parameter, the width of the antenna, as skin depth effect presence causes loss of antenna performance (see Aizawa, page 10, para 0205).

Regarding claim 5, Usami (refer to Figure 14) teaches that the semiconductor apparatus further comprises a tape (73) coated with an adhesive layer (111), and a side of said antenna (74) of said semiconductor device is adhered to said adhesive layer (111).

Regarding claim 6, Usami teaches a radiation antenna is connected in place of said antenna (page 1, paragraph 0006).

Regarding claim 7, Usami teaches paper sheet (page 2, para 0039, 5th sentence and page 3, para 0043, 8th to 10th sentences) characterized by comprising:

the semiconductor device recited in claim 1 or 2; and

a protective member (like paper, see above) having a recess (page 2, para 0039, 5th sentence and page 3, para 0043, 8th to 10th sentences),

wherein the semiconductor device is threaded being included in said recess of said protective member (page 2, para 0039, 5th sentence and page 3, para 0043).

Regarding claim 9, Usami teaches etching a wafer from a rear surface thereof to an oxide film inside the wafer to form separation grooves (page 4, para 0048, last 6 sentences).

7. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Usami and Aizawa as applied to claims 1 or 2 above, and further in view of IDS reference Masaharu (JP 2000-331830), hereinafter IDS reference Masaharu.

Regarding claim 3, Usami teaches substantially the claimed structure but does not teach that “electrode portions for connecting said antenna and said integrated circuit are formed in areas where a resin layer is formed in a tapered shape”. Masaharu (refer to Figures 1-3) teaches an antenna on an integrated circuit device, wherein electrode portions (formed connecting to 6) for connecting an antenna (par of 22) and said integrated circuit (21) are formed in areas where a resin layer is formed in a tapered shape (see 6a and 6b Figure 3, also see abstract of Masaharu). It would have been obvious to one of ordinary skills in the art at the time of the invention to modify the invention of Usami in view of Masaharu as above. The ordinary artisan would have been motivated to modify Usami for at least the purpose of facilitating reliable

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interconnection of conducting members through the resin layer (see abstract of Masaharu).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to AJAY K. ARORA whose telephone number is (571)272-8347. The examiner can normally be reached on Mon through Fri, 8am to 4:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Thao X. Le can be reached on (571) 272-1708. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/A. K. A./
Examiner, Art Unit 2892

/Thao X Le/
Supervisory Patent Examiner, Art
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